We claim:

1. A magnetic structure, comprising:

a magnetic memory cell structure having a top and a bottom;

a first conductive line to conduct a row current to generate a magnetic field to partially select the magnetic memory cell structure, the first conductive line adjoining the bottom of the magnetic memory cell structure; and

a second conductive line electrically coupled to the first conductive line to conduct the row current to increase the magnetic field to partially select the magnetic memory cell structure, the second conductive line adjoining the top of the magnetic memory cell structure.

2. The magnetic structure of claim 2, wherein the first conductive line has a first terminal, a second terminal, a top, and a bottom, wherein the top of the first conductive line is adjacent to the bottom of the magnetic memory cell structure, and wherein the row current enters the first terminal and exits the second terminal.

3. The magnetic structure of claim 1, wherein the second conductive line has a first terminal, a second terminal, a top, and a bottom, wherein the bottom of the second conductive line is adjacent to the bottom of the magnetic memory cell structure, and wherein the row current enters the second terminal and exits the first terminal.

4. The magnetic structure of claim 3, further comprising a via and a conductive plug formed therein to couple the second terminal of the first conductive line and the first terminal of the second conductive line.

5. The magnetic structure of claim 4, wherein the first conductive line, the second conductive line, and the via comprise copper.

6. A method for forming a magnetic structure, comprising:

forming a first conductive line parallel a first axis having two terminals and two sides;

forming a second conductive line parallel a second axis having two terminals and two sides; and

forming a magnetic memory cell structure having four sides, one of the four sides adjoining to one of the two sides of the first conductive line, another of the four sides adjoining to one of the two sides of the second conductive line, the another of the four sides oppositely situated with respect to the one of the four sides.

7. The method of claim 6, wherein the first axis is parallel to the second axis.

8. The method of claim 6, wherein forming a magnetic memory cell structure comprises forming a magnetic memory cell structure that is interposed between the first conductive line and the second conductive line.

9. The method of claim 6, further comprising forming a via electrically coupling one of the terminals of the first conductive line and to one of the terminals of the second conductive line.

10. The method of claim 6, wherein forming the magnetic memory cell structure includes multiple layers, each layer selected from a group consisting of a barrier layer, a seed layer, a pinning layer, a pinned layer, a tunneling layer, and a sense layer.

11. A magnetic structure, comprising:

a magnetic memory cell structure having multiple layers, the multiple layers including a first ferromagnetic layer, a tunneling layer, and a second ferromagnetic layer;

a nonconductive layer surrounding the magnetic memory cell structure to expose a portion of the multiple layers of the magnetic memory cell structure remaining exposed through

the nonconductive layer, the exposed portion of the multiple layers including the tunneling layer; and

a conductive layer for conducting a current to generate a magnetic field to partially select the magnetic memory cell structure, the conductive layer formed superjacent the magnetic memory cell structure and the nonconductive layer, the conductive layer adjoining the exposed portion of the multiple layers of the magnetic memory cell structure.

12. The magnetic structure of claim 11, wherein the conductive layer includes a first depth and a second depth having a magnitude less than the first depth, the second depth corresponding to a portion where the conductive layer adjoins to the top layer of the magnetic memory cell structure.

13. The magnetic structure of claim 11, wherein the conductive layer conducts a row current.

14. The magnetic structure of claim 11, further comprising a top layer superjacent the first ferromagnetic layer, and wherein the top layer of the magnetic memory cell structure includes a barrier layer to inhibit diffusion of atoms from the conductive layer into the magnetic memory cell structure.

15. The magnetic structure of claim 14, wherein the barrier layer comprises tantalum.

16. A method for making a magnetic structure, comprising:

forming a memory cell structure having multiple layers, the multiple layers including a first ferromagnetic layer, a tunneling layer, and a second ferromagnetic layer;

forming a nonconductive layer that overlies the magnetic memory cell structure;

etching the nonconductive layer to expose a portion of the multiple layers, the exposed portion of the multiple layers including the tunneling layer; and

forming a conductive layer over the magnetic memory cell structure and the nonconductive layer, the conductive layer having a first depth in an area over the nonconductive layer and a second depth in an area over the portion of the top layer of the magnetic memory cell structure, the magnitude of the second depth less than the magnitude of the first depth.

17. The method of claim 16, wherein the multiple layers include a barrier layer formed superjacent the first ferromagnetic layer.

18. The method of claim 17, wherein etching includes etching the nonconductive layer to expose a portion of the barrier layer.

19. The method of claim 18, wherein etching includes etching using a dry etch technique.

20. The method of claim 18, wherein etching includes etching to form a trench for a copper damascene process.

21. A magnetic structure having an active area and an inactive area, comprising:

a substrate having an active area and an inactive area;

a memory cell structure formed over the active area of the substrate;

a nonconductive layer formed surrounding the memory cell structure; and

a conductive line adjacent the magnetic memory cell structure to conduct a current to generate a magnetic field to partially select the magnetic memory cell structure, the conductive line having a first width over the inactive area and a second width over the active area, the magnitude of the second width less than the magnitude of the first width.

22. The magnetic structure of claim 21, wherein the conductive line is formed below the memory cell structure.

23. The magnetic structure of claim 21, wherein the conductive line is formed above the memory cell structure.

24. The magnetic structure of claim 21, wherein the conductive line is formed from copper.

25. The magnetic structure of claim 24, wherein the memory cell structure includes a tantalum barrier layer that inhibits undesired diffusion of copper atoms.

26. A method for making a magnetic structure, comprising:

forming a memory cell structure having multiple layers, the multiple layers including a first ferromagnetic layer, a tunneling layer, and a second ferromagnetic layer;

forming a nonconductive layer that overlies the magnetic memory cell structure;

etching the nonconductive layer to expose a portion of the multiple layers, the exposed portion of the multiple layers excluding portions of the multiple layers beyond the tunneling layer; and

forming a conductive layer over the magnetic memory cell structure and the nonconductive layer, the conductive layer having a first depth in an area over the nonconductive layer and a second depth in an area over the portion of the top layer of the memory cell structure, the magnitude of the second depth less than the magnitude of the first depth.

27. The method of claim 26, wherein the multiple layers include a barrier layer, wherein the barrier layer is superjacent the first ferromagnetic layer.

28. The method of claim 27, wherein etching includes etching the nonconductive layer to expose a portion of the barrier layer.

29. The method of claim 28, wherein etching includes etching using a dry etch technique.

30. The method of claim 28, wherein etching includes etching to form a trench for a copper damascene process.

31. A computer system, comprising:

a processor;

a memory system that comprises a plurality of memory modules, one of the plurality of the memory modules comprises a plurality of memory devices;

a plurality of command links coupled to the plurality of memory devices to communicate at least one command signal;

a plurality of data links coupled to the plurality of memory devices to communicate data;

a memory controller;

at least one user interface device, wherein the at least one user interface device includes a monitor;

at least one output device, wherein the at least one output device includes a printer;

at least one bulk storage device, wherein at least one memory device of the plurality of memory devices is a magnetic structure, which comprises:

a magnetic memory cell structure having a top and a bottom; and

a first conductive means for increasing the flux density to unambiguously select the magnetic memory cell structure for reading and writing of information.

32. A magnetic memory structure, comprising:

a memory cell having a ferromagnetic nature to change between first and second states when subject to application of a magnetic field having a magnitude greater than a threshold value; and

a current path through which a current conducts, the current path having a first portion and a second portion to provide a magnetic field that couples the memory cell, the first portion of the current path providing a first magnetic field and the second portion of the current path providing a second magnetic field, the sum magnitude of the first and second magnetic fields exceeding the threshold value.

33. The magnetic memory structure of claim 32 wherein the memory cell comprises a ferromagnetic material having the characteristic that the state of the memory cell is dependent on a previously applied magnetic field.

34. The magnetic memory structure of claim 33 wherein the memory cell comprises multiple layers, each layer selected from a group consisting of a barrier layer, a seed layer, a pinning layer, a pinned layer, a tunneling layer, and a sense layer.

35. The magnetic memory structure of claim 34 wherein the barrier layer comprises a layer formed from tantalum.

36. The magnetic memory structure of claim 34 wherein the seed layer comprises a layer formed from a nickel ferrite layer.

37. The magnetic memory structure of claim 33 wherein the magnetic memory structure further includes a first surface and a second surface opposite of the first surface, and the first portion of the current path conducts the current in proximity of the first surface in a first direction and the second portion of the current path conducts the current in proximity of the second surface in a second direction opposite of the first direction.

38. The magnetic memory structure of claim 37 wherein the first surface is beneath the second surface.

39. The magnetic memory structure of claim 37 wherein the first surface is perpendicular to the second surface.

40. A magnetic memory structure, comprising:

a magnetic memory cell having a ferromagnetic nature to change between first and second states when subject to application of a magnetic field having a magnitude greater than a threshold value; and

a current path through which a current conducts to create a magnetic field coupling the magnetic memory cell, the current path having a first portion and a second portion, the first portion of the current path located adjacent to the magnetic memory cell and having a first cross-sectional area that is less than a second cross-sectional area of the second portion of the current path.

41. The magnetic memory cell of claim 40 wherein the magnetic memory cell includes a first surface located beneath a second surface and the first portion of the current path adjacent to the first surface.

42. The magnetic memory cell of claim 40 wherein the magnetic memory cell includes a first surface located beneath a second surface, and the first portion of the current path adjacent to the second surface.

43. The magnetic memory cell of claim 40 wherein the magnetic memory cell comprises multiple layers, each layer selected from a group consisting of a barrier layer, a seed layer, a pinning layer, a pinned layer, a tunneling layer, and a sense layer.

44. The magnetic memory cell of claim 40 wherein the first portion of the current path has a first width and the second portion of the current path has a second width, the first width less than the second width.

45. The magnetic memory cell of claim 40 wherein the first portion of the current path has a first depth and the second portion of the current path has a second depth, the first depth less than the second depth.

46. A magnetic memory device, comprising:

a memory array having a plurality of magnetic memory cells arranged in rows and columns, each of the magnetic memory cells having

a memory cell having a ferromagnetic nature to change between first and second states when subject to application of a magnetic field having a magnitude greater than a threshold value; and

a current path through which a current conducts, the current path having a first portion and a second portion to provide a magnetic field that couples the memory cell, the first portion of the current path providing a first magnetic field and the second portion of the current path providing a second magnetic field, the sum magnitude of the first and second magnetic fields exceeding the threshold value.

47. A magnetic memory device, comprising:

a memory array having a plurality of magnetic memory cells arranged in rows and columns, each of the magnetic memory cells having

a magnetic memory cell having a ferromagnetic nature to change between first and second states when subject to application of a magnetic field having a magnitude greater than a threshold value; and

a current path through which a current conducts to create a magnetic field coupling the magnetic memory cell, the current path having a first portion and a second portion, the first portion of the current path located adjacent to the magnetic memory cell and having a first cross-sectional area that is less than a second cross-sectional area of the second portion of the current path.

48. A method for forming a magnetic memory device, comprising:

forming a magnetic memory cell having the characteristic to change between first and second states when subject to application of a magnetic field having a magnitude greater than a threshold value; and

forming from a conductive layer a current path having a first portion and a second portion, the first portion of the current path formed adjacent to the magnetic memory cell and having a first cross-sectional area that is less than a second cross-sectional area of the second portion of the current path.

49. The method of claim 48 wherein forming the magnetic memory cell comprises:

forming a barrier layer having a thickness of approximately five nanometers;
forming a seed layer over the barrier layer from a nickel ferrite material;
forming a pinning layer over the seed layer from an anti-ferromagnetic material;
forming a pinned layer over the pinning layer from a ferromagnetic material;
forming a tunneling layer over the pinned layer from dialuminum trioxide;
forming a sense layer over the tunneling layer from a ferromagnetic material; and
forming another barrier layer from a tantalum material.

50. The method of claim 48 wherein forming the current path comprises forming a current path having a first width through the first portion of the current path and having a second width through the second portion of the current path, the first width less than the second width.

51. The method of claim 48 wherein forming the current path comprises:
forming a trench in the nonconductive layer using a damascene process;
electrochemical plating to deposit a highly conductive material into the trench;
planarize the trench to level a copper overfill;
photolithographing to partially expose the first portion of the current path; and

etching to removed the partially exposed to define a first width for the first portion of the current path, the current path having a second width for the second portion, the first width less than the second width.

52. The method of claim 48 wherein forming the current path comprises forming a current path having a first height through the first portion of the current path and having a second height through the second portion of the current path, the first height less than the second height.

53. The method of claim 48 wherein forming the current path comprises:

forming over the magnetic memory cell a nonconductive layer;

forming from the nonconductive layer a trench having a first depth and a second depth, the act of forming the trench exposing at least a portion of the magnetic memory cell, the second depth measuring from the top of the trench to the at least a portion of the magnetic memory cell, the second depth less than the first depth; and

filling the trench with a highly conductive substance.